

Solar-Powered Savings: Impacts of Net Zero Electricity at BEER NUTS

E3 CASE STUDY AT AN ILLINOIS FOOD MANUFACTURER

SUMMARY

With a payback of only 2.5 years, a rooftop solar PV installation proposed for a nut roasting facility in central Illinois puts them on the path to achieving net zero electricity. On-site solar yields cost savings, environmental leadership and competitive advantage, and is a technology that can be implemented in most manufacturing facilities.

BACKGROUND

In Fall of 2019, [Illinois Sustainable Technology Center](#) (ISTC) and their partners completed an [Economy, Energy, and Environment](#) (E3) assessment at BEER NUTS, a small, family-owned Illinois snack facility. This food manufacturer is firmly committed to good business practices that support the fundamental elements of sustainability: people, planet, and profit.



BEER NUTS operates manufacturing, packaging, shipping, and office spaces in a multi-level, 100,000 square foot facility on a 16/4 schedule. It produces a variety of snack products and exclusively manufactures its own products with a wide range of recipes. Products are distributed through various retail outlets and direct to consumers.

E3 ASSESSMENT

Three organizations provided this assistance, the [Illinois Manufacturing Excellence Center - IMEC](#) (Economy), [Energy Resources Group - ERG](#) (Energy), and the [Illinois Sustainable Technology](#)

[Center - ISTC](#) (Environment). Per BEER NUTS' request, the assessment included the feasibility of on-site solar photovoltaics (PV) which was supported by [IL-Solar, Inc.](#) The team observed production practices and identified several opportunities for continuous improvement.

SOLAR PHOTOVOLTAIC TECHNOLOGY

[Solar photovoltaic \(PV\)](#) technology consists of silicon panels that convert sunlight to direct current (DC) electricity. Inverters convert DC electricity to alternating current (AC), making it usable for a facility or the grid. When installed on-site, electricity generated by the panels directly supplies a facility's electrical needs. Any excess electricity not used by the facility, or generated in off hours, is sent to the electrical grid. In Illinois, renewable energy generators are credited for excess energy under net metering regulations.

PAYING FOR ITSELF IN LESS THAN 3 YEARS

The E3 assessment revealed electricity savings opportunities that will reduce usage by 436,000 kWh annually. Once implemented, BEER NUTS' electricity usage will drop to 342,000 kWh. Using this estimate and additional factors, IL-Solar Inc. proposed a 260 kW solar installation costing approximately \$481,000. This array, projected to generate 342,370 kWh annually, would supply 100% of BEER NUTS electricity.

Despite the sizable upfront capital investment, the array could result in first-year cost of \$94,820 through a reduced power bill and federal, state, and utility incentives. With continuing energy cost savings and incentives, BEER NUTS will break even at 2.5 years of ownership and will see a reduction of \$149,000 in utility costs by the 5th year. Like most manufacturers, BEER NUTS

KEY PERFORMANCE INDICATORS

- ▶ \$481,000 solar array cost
- ▶ \$641,000 federal, state and utility incentives and electricity savings years 1-5*
- ▶ 2.5 year breakeven point
- ▶ 330.0 metric tons CO₂ equivalent annual avoidance potential

**Based on incentives available in Q3 2020*

SOLAR PV ARRAY SPECIFICATIONS

- ▶ **Size Array:** 260kW installation
- ▶ **PV Panels:** 650 400-watt monocrystalline panels
- ▶ **Annual Projected Power Generation:** 342,370 kWh

ABOUT BEER NUTS

Location: Bloomington, IL

of employees: 50

Products: nuts and snack mixes

NAICS code: 311911

Website: <https://beernuts.com/>

"The case for solar is incredible with the incentives in place. It's worth doing the work to figure the ROI because the returns were so significant."

– Andy Shirk, President of BEER NUTS

has aggressive payback requirements of 1-2 years. Solar not only fits the bill, it enables energy cost savings for years to come.

ACHIEVING NET ZERO ELECTRICITY – AN ENVIRONMENTAL WIN AND COMPETITIVE ADVANTAGE

After implementing the proposed E3 recommendations, BEER NUTS' operations will be on target to achieve net zero electricity, meaning that the annual electricity delivered to this facility from the grid will be less than or equal to the renewable energy exported from this facility to the grid. It will also put them on the path to net zero energy.

Finally, these recommendations would reduce BEER NUTS' carbon emissions by 329.95 metric tons. This gives them a significant competitive advantage when working with retailers like [Walmart](#), [Kroger](#), and [Amazon](#) that have established sustainability benchmarks both for their own operations and for their suppliers.

APPLICABILITY ACROSS MANUFACTURING SECTORS

This case study demonstrates that a small food manufacturer in central Illinois can replace its annual electricity usage with solar at a 2.5-year payback. Manufacturing facilities across Illinois can replicate these practices with similar benefits, regardless of sector, size, location, or familiarity with solar.

On-site solar is a winning strategy for sustainability-minded manufacturers. Replacing coal and natural gas-fired

electricity from Illinois' grid¹ with solar is a viable strategy that reduces CO2 emissions and energy costs.

Solar improves air quality and human health; helps businesses meet internal and external sustainability goals; lowers energy costs, which improves competitiveness and; increases energy independence by reducing reliance on the power grid. On-site solar also demonstrates leadership in climate change mitigation and sustainability, showcases strategic foresight, and embraces a future powered by renewables.



¹Sources of electricity supplied to Ameren Illinois customers as of September 30, 2020 [Environmental Disclosure Statement](#).

CURRENT STATUS

As of Q1 2021, BEER NUTS is actively implementing energy efficiency measures and anticipates revisiting solar in Q2 2021.

EFFICIENCY OPPORTUNITIES

Assessment identified the following energy savings opportunities

- ▶ Convert compressors from air-cooled to water-cooled
- ▶ Refrigeration evaporator coils defrost controls
- ▶ LED lighting upgrade

Recommendations annual impact (if implemented)

- ▶ 436,000 kWh avoided
- ▶ 5,700 therms avoided
- ▶ \$49,600 savings

Opportunities for future consideration

- ▶ Convert equipment fueled by natural gas, diesel, or CNG to an electric counterpart
- ▶ Convert fleet vehicle(s) to electric vehicles and install EV chargers

“It’s a three-prong approach – (the) right thing to do, right thing for our business, right thing for our customer.”

– Andy Shirk, President of BEER NUTS

This case study was developed as part of a grant from the U.S. Environmental Protection Agency Region 5 under the Illinois Conservation of Resources and Energy Program.



Prairie Research Institute

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

**ILLINOIS SUSTAINABLE TECHNOLOGY CENTER
TECHNICAL ASSISTANCE PROGRAM**

TN21-140

©2021 UNIVERSITY OF ILLINOIS BOARD OF TRUSTEES

ABOUT TAP

The Technical Assistance Program (TAP) makes companies and communities more competitive and resilient with sustainable business practices, technologies, and solutions. TAP works at the intersection of industry, science and government to help clients achieve profitable, sustainable results. **Find other fact sheets and more information about TAP at:**

ISTC.ILLINOIS.EDU/TECHASSIST